

***FlyBy Math™* Alignment to  
Utah Mathematics – Elementary Algebra [2002]  
Process Standards, Core Standards and Objectives**

### Process Standards

#### Problem Solving

##### Process Standard

5. Utilize different problem solving strategies including:
- Drawing a picture or diagram.
  - Looking for a pattern.
  - Identifying counterexamples.
  - Choosing an appropriate operation.
  - Guessing and checking.
  - Making a list, table, graph, or equation.
  - Working backwards.
  - Eliminating possibilities.
  - Making a model or simulation.
  - Solving a simpler or related problem.
  - Checking the reasonableness of results.
  - Using proportional reasoning.

##### *FlyBy Math™* Activities

- Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
- Conduct simulation and measurement for several aircraft conflict problems.
- Use tables, graphs, and equations to solve aircraft conflict problems.

8. Estimate solutions to problems and determine the reasonableness of answers by relating them to the estimates.

- Predict outcomes and explain results of mathematical models and experiments.

#### Reasoning and Proof

##### Process Standard

2. Explain and justify problem-solving procedures.

##### *FlyBy Math™* Activities

- Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.

3. Examine patterns and note regularities and irregularities in various types of problems.

- Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.

#### Communication

##### Process Standard

1. Express mathematical ideas coherently and clearly to peers, teachers, and others.

##### *FlyBy Math™* Activities

- Predict outcomes and explain results of mathematical models and experiments.

#### Connections

##### Process Standard

1. Formulate real-world situations that require extended investigations, solve them, and justify answers.

##### *FlyBy Math™* Activities

- Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.

2. Establish connections among mathematical expressions, physical models, pictorial representations, and real-world situations.	--Apply mathematics to predict and analyze aircraft conflicts and validate through experimentation.  --Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.
5. Recognize and apply mathematical ideas and relationships in areas outside the mathematics classroom, e.g., art, science, other curricular areas, and everyday life.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
<b>Representation</b>	
<b>Process Standard</b>	<b><i>FlyBy Math™</i> Activities</b>
2. Represent mathematical concepts using physical models, visualizations, and appropriate symbolic notations.	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.  --Conduct simulation and measurement for several aircraft conflict problems.
3. Represent problem situations verbally, numerically, graphically, geometrically, or algebraically.	--Represent distance, speed, and time relationships for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.

## Standard 1

Students will acquire number sense and perform operations with rational numbers.

### Objective 1

Compute fluently and make reasonable estimates.

<b>Objective</b>	<b><i>FlyBy Math™</i> Activities</b>
1. Estimate solutions to problems.	--Predict outcomes and explain results of mathematical models and experiments.
2. Compute solutions to problems.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
3. Determine the reasonableness of an answer by relating it to the problem.	--Predict outcomes and explain results of mathematical models and experiments.

## Standard 2

Students will represent and analyze mathematical situations and properties using patterns, relations, functions, and algebraic symbols.

### Objective 1

Use patterns, relations, and functions to represent mathematical situations.

<b>Objective</b>  1. Write algebraic expressions or equations to generalize visual patterns, numerical patterns, relations, data sets, or scatter plots.	<b><i>FlyBy Math™</i> Activities</b>  --Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.
4. Identify the slope of a linear function as an average rate of change in real-world situations.	--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.  --Interpret the slope of a line in the context of a distance-rate-time problem.
<b>Objective 2</b> Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.	
<b>Objective</b>  1. Solve real-world problems involving constant rates of change, e.g., rates of travel, hourly wages, or rates of interest.	<b><i>FlyBy Math™</i> Activities</b>  --Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.  --Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.
3. Solve systems of two linear equations or inequalities: a. Numerically; e.g., from a table or guess and check. b. Algebraically. c. Graphically. d. Using technology.	--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.  --Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.
6. Solve linear formulas and literal equations for a specified variable, e.g., solve for $p$ in $I = prt$ .	--Use the distance-rate-time formula to predict and analyze aircraft conflicts.
<b>Objective 3</b> Represent quantitative relationships using mathematical models and symbols.	
<b>Objective</b>  1. Identify the slope of a line when given: a. A set of two ordered pairs. b. An equation of a linear function. c. The graph of a linear function. d. A table of values.	<b><i>FlyBy Math™</i> Activities</b>  --Interpret the slope of a line in the context of a distance-rate-time problem.
5. Determine the effect of parameter changes on the graphs of linear relations.	--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.  --Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.

8. Graph linear functions: a. By plotting points. b. By finding x- and y-intercepts. c. Using the slope-intercept form of a line. d. Using the slope and any point on the line.	--Represent distance, speed, and time relationships for constant speed cases using linear equations and a Cartesian coordinate system.
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### Standard 3

Students will solve problems using spatial and logical reasoning, applications of geometric principles, and modeling.

#### Objective 2

Specify locations and describe spatial relationships using coordinate geometry.

Objective	<i>FlyBy Math™</i> Activities
2. Solve problems using the distance formula.	--Use the distance-rate-time formula to predict and analyze aircraft conflicts.

### Standard 4

Students will understand and apply measurement tools, formulas, and techniques.

#### Objective 1

Understand measurable attributes of objects and the units, systems, and processes of measurement.

Objective	<i>FlyBy Math™</i> Activities
1. Solve problems and express answers using appropriate units of measure.	--Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation.
2. Express the rate of change as a ratio of two different measures.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.  --Interpret the slope of a line in the context of a distance-rate-time problem.
3. Select appropriate units to achieve the desired precision when solving problems.	--Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation.

### Standard 5

Students will draw conclusions using concepts of probability after collecting, organizing, and analyzing a data set.

#### Objective 1

Formulate and answer questions by collecting, organizing, and analyzing data.

Objective	<i>FlyBy Math™</i> Activities
1. Collect, record, organize, and display a set of data.	--Conduct simulation and measurement for several aircraft conflict problems.  --Represent distance, rate, and time data using tables, line plots, bar graphs, and line graphs.